WHAT IS CLAIMED:

1. A Raman amplifying apparatus for amplifying WDM signal, comprising:

a measuring means for measuring a power of a first back-scattered light, coming from an optical fiber, arising from a first power of an excitation light, and a power of a second back-scattered light, coming from the optical fiber, arising from a second power of the excitation light which is larger than the first power;

an outputting means for outputting an excitation light to the optical fiber, the wavelength of which is different from the wavelength of the first back-scattered light and the wavelength of the second back-scattered light;

a controlling means for controlling the second power; and

a demultiplexing means for demultiplexing at least one of the first back-scattered light and the second back-scattered light coming from the optical fiber.

2. The Raman amplifying apparatus as claimed in claim 1, wherein:

the controlling means controls the second power so as to make the ratio of the power of the first back-scattered light to the power of the second back-scattered light constant at a certain section of the optical fiber.

3. The Raman amplifying apparatus as claimed in claim 2, wherein:

the first power is zero amount of power, and the second power is non-zero amount of power controlled by the controlling means.

4. A Raman amplifying apparatus for amplifying WDM signal, comprising:

an excitation light outputting means for outputting an excitation light to an optical fiber;

a test light outputting means for outputting a test light to the optical fiber, the wavelength of which is different from the wavelength of the excitation light;

a measuring means for measuring a power of a first back-scattered light, coming from the optical fiber, excited by a first power of the excitation light, and a power of a second back-scattered light, coming from the optical fiber, excited by a second power of the excitation light which is larger than

the first power;

a controlling means for controlling a power of the excitation light; and

a multiplexing or demultiplexing means for multiplexing or demultiplexing connected to the excitation light outputting means, the test light outputting means and the optical fiber.

5. The Raman amplifying apparatus as claimed in claim 4, wherein:

the controlling means controls the second power so as to make the ratio of the power of the first back-scattered light to the power of the second back-scattered light constant at a certain section of the optical fiber.

6. A Raman amplifying apparatus for amplifying WDM signal, comprising:

a measuring circuit that measures a power of a first back-scattered light, coming from an optical fiber, arising from a first power of an excitation light, and a power of a second back-scattered light, coming from the optical fiber, arising from a second power of the excitation light which is larger than the first power;

an outputting circuit that outputs the excitation light to the optical fiber, the wavelength of which is different from the wavelength of the first back-scattered light and the wavelength of the second back-scattered light;

a controller that controls the second power; and

a WDM decoupler that decouples at least one of the first back-scattered light and the second back-scattered light coming from the optical fiber.

7. The Raman amplifying apparatus as claimed in claim 6, wherein:

the controller controls the second power so as to make the ratio of the power of the first back-scattered light to the power of the second back-scattered light constant at a certain section of the optical fiber.

8. The Raman amplifying apparatus as claimed in claim 7, wherein:

the first power is zero amount of power, and the second power is non-zero amount of power controlled by the controller.

9. A Raman amplifying apparatus for amplifying WDM signal, comprising:

an excitation light outputting circuit that outputs an excitation light to an optical fiber;

a test light outputting circuit that outputs a test light to the optical fiber, the wavelength of which is different from the wavelength of the excitation light;

a measuring circuit that measures a power of a first back-scattered light, coming from the optical fiber, excited by a first power of the excitation light, and a power of a second back-scattered light, coming from the optical fiber, excited by a second power of the excitation light which is larger than the first power;;

a controller that controls the second power; and

a WDM coupler connected to the first outputting circuit and the second outputting circuit and the optical fiber.

10. The Raman amplifying apparatus as claimed in claim 9, wherein:

the controller controls the second power so as to make the ratio of the power of the first back-scattered light to the power of the second back-scattered light constant at a certain section of the optical fiber.

11. A relay station for relaying a WDM signal, comprising:

a measuring circuit that measures a power of a first back-scattered light, coming from a optical fiber, arising from a first power of an excitation light, and a power of a second back-scattered light, coming from the optical fiber, arising from a second power of the excitation light which is larger than the first power;

an outputting circuit that outputs the excitation light to an optical fiber, the wavelength of which is different from the wavelength of the first back-scattered light and the wavelength of the second back-scattered light;

a controller that controls the second power;

a WDM decoupler that decouples at least one of the first back-scattered light and the second back-scattered light; and

an optical amplifier that amplifies a WDM signal inputted through the WDM decoupler and outputs the WDM signal to another optical fiber.

12. The relay station as claimed in claim 11, wherein:

the controller controls the second power so as to make the ratio of the power of the first back-scattered light to the power of the second back-scattered light constant at a certain section of the optical fiber.

13. The relay station as claimed in claim 12, wherein:

the first power is zero amount of power, and the second power is non-zero amount of power controlled by the controller.

14. A relay station for relaying a WDM signal, comprising:

an excitation light outputting circuit that outputs an excitation light to an optical fiber;

a test light outputting circuit that outputs a test light to the optical fiber, the wavelength of which is different from the wavelength of the excitation light;

a measuring circuit that measures power of a first back-scattered light, coming from the optical fiber, excited by a first power of the excitation light, and a power of a second back-scattered light, coming from the optical fiber, excited by a second power of the excitation light which is larger than the first power;

a controller that controls the second power;

a WDM coupler connected to the first outputting circuit, the second outputting circuit and the optical fiber; and

an optical amplifier that amplifies inputted a WDM signal through the WDM decoupler and outputs the WDM signal to another optical fiber.

15. The relay station as claimed in claim 14, wherein:

the controller controls the second power so as to make the ratio of the power of the first back-scattered light to the power of the second back-scattered light constant at a certain section of the optical fiber.

16. A method of measuring Raman gain of an optical fiber, comprising steps of:

outputting an excitation light to the optical fiber;

measuring a power of a first back-scattered light, coming from the optical fiber, arising from a first power of an excitation light, and a power of a second back-scattered light, coming from the optical fiber, arising from a second power of the excitation light which is larger than the first power;

controlling the second power based on a result the measuring step;

decoupling at least one of the first back-scattered light and the second back-scattered light coming from the optical fiber.

17. The method as claimed in claim 16, wherein;

the controlling step controls the second power of the excitation light so as to make the ratio of the power of the first back-scattered light to

the power of the second back-scattered light constant at a certain section of the optical fiber.

18. The method as claimed in claim 17, wherein;

the first power is zero amount of power, and the second power is non-zero amount of power controlled by the controlling step.

19. A method of measuring Raman gain of an optical fiber, comprising steps of:

outputting the excitation light to the optical fiber;

outputting a test light to the optical fiber, the wavelength of which is different from the wavelength of the excitation light;

measuring a power of a first back-scattered light, coming from the optical fiber, excited by a first power of the excitation light, and a power of a second back-scattered light, coming from the optical fiber, excited by a second power of the excitation light;

controlling the second power based on the result of measuring step;

multiplexing the excitation light and the test light wavelength going to the optical fiber; and

demultiplexing at least one of the first back-scattered light and the second back-scattered light coming from the optical fiber.

20. The method as claimed in claim 19, wherein;

the controlling step controls the second power so as to make the ratio of the power of the first back-scattered light to the power of the second back-scattered light constant at a certain section of the optical fiber.